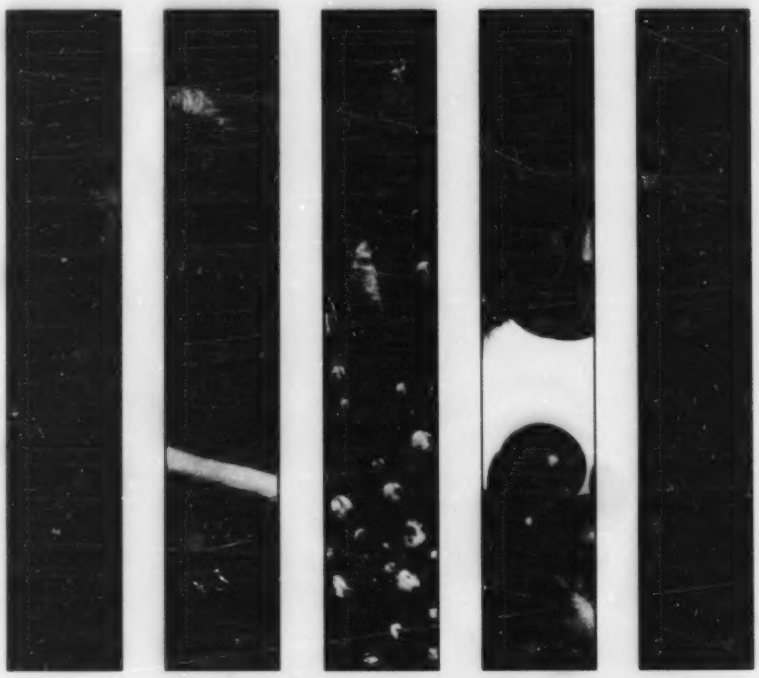
Lethbridge Research Centre

2001 Annual Report

Innovation for a better quality of life



Canada

Research Progress For All Canadians

Public research supports economic growth, while protecting food security and environmental health.

Dr. Gordon Dorrell

Dr. Steve Morgan Jones

Many new technologies are reshaping the face of science and presenting new opportunities for Canadians. As public researchers, we've seen growing support for the public role in research during this important time, and increasing interest from Canadians in what these opportunities mean for their families and communities.

Many of the new technologies we see today stem from breakthroughs in biological sciences, which have given us a better understanding of the genetic codes on which all life is based. This progress in "life sciences" and other areas of research will ultimately affect Canadians in all walks of life.

Agriculture and Agri-Food Canada will use this progress to pursue research that will best serve the public good. This means working toward innovations to support economic growth, while protecting food security and environmental health.

Overall, the direction of our research is expanding from its traditional focus on basic agricultural production to include initiatives that will help Canada capitalize on new opportunities, particularly in life sciences.

Consumer demands for agricultural products have become more precise. With more segmentation in the marketplace, Canada needs innovations to diversify what it offers and expand growth opportunities. This includes improving existing food products, making new food production more viable, and developing new non-food products from renewable agricultural resources. The goal is to give Canada a leading role in the life sciences economy, with the technology to capture premiums.

At the same time, food safety and environmental issues have become vital. Long-standing issues such as the fate of pesticides in the environment remain a great concern. New high-profile issues such as the safety of genetically-modified organisms, and the vulnerability of the food system to problems such as *E. coli* O157:H7, have added to the public demand for scientific scrutiny.

For complete research information

The Lethbridge Research Centre is a public research institution, supported and driven by the needs of Canadians. We encourage your inquiries on any aspect of our research.

The fastest, easiest way to access all Lethbridge Research Centre information is through our Web site, www.agr.gc.ca/science/lethbridge. The site features the latest reports on research progress, details on program activities and links to the complete Agriculture and Agri-Food Canada network.

Inquiries can also be directed by phone, (403) 327-4561, fax (403) 382-3156, or mail: P.O. Box 3000, Lethbridge, Alberta, Canada, T1J 4B1.

As a result, our research approach is to continue to promote economic growth through scientific innovation, with a strong emphasis on life sciences, and to tie that goal inextricably to meeting high food safety and environmental standards.

SCIENCE DELIVERS BENEFITS

Our studies at the Lethbridge Research Centre are a good example of the specific benefits this approach will deliver. Already, the Centre runs a large portion of its programs in the life sciences area, and that is complemented by strong programs in more traditional areas. The Centre also has a large research effort on sustainable agricultural production and the long-term health of agricultural ecosystems, and that effort is expanding. Each of these areas has many examples of progress.

Crop sciences research is helping improve crops and develop new systems of food production to reduce costs, protect the land, and open up new markets. One important focus is finding new ways to protect crops and reduce the reliance on chemical pesticides.

In livestock research, studies are helping animals fight disease, use feed more efficiently, and produce manure with less phosphorus. One component is aimed at developing natural alternatives to antimicrobial products, which can reduce the threat of resistant bacteria.

In land resource sciences, researchers are finding ways to utilize manure as a resource, rather than disposing of it as a waste. This protects soil, water and air quality and promotes a healthy environment. The specific benefits range from making low input agriculture more viable to reducing greenhouse gas emissions.

NEW BUILDING ANCHORS GROWTH

All of these benefits are the result of a healthy public research sector, which has gained strength in recent years with public support.

As a result, the Lethbridge Research Centre is undergoing a large-scale expansion that will substantially increase its research capacity. This expansion, slated for completion in 2002, will include a new building and a retrofit of existing facilities. It will give scientists more resources for several research areas.

One important facility addition will be new laboratories for biological control research. This area of science, called biocontrol, focuses on using living organisms to protect crops, livestock and land. Biocontrol is an important part of a larger trend toward integrated pest management, a strategy that uses several alternative controls to reduce the need for chemical pesticides. Integrated pest management also gives producers more options for safe, cost-effective and sustainable control.

The new building will also include modern greenhouses that can simulate different environmental conditions, making it easier and more cost-effective for researchers to develop agricultural systems that protect the environment.

All of this progress – in terms of both research and facilities – is the direct result of public support. It puts Canada in a strong position to manage its agriculture and agri-food resources well into the century. On behalf of all scientists, administrators and support staff at Agriculture and Agri-Food Canada, we extend our thanks to all Canadians. We would be pleased to receive your comments on this report, and provide further information on topics of interest.

Dr. Gordon Dorrell, Acting Assistant Deputy Minister,
Agriculture and Agri-Food Canada Research Branch

Dr. Steve Morgan Jones, Director,
Agriculture and Agri-Food Canada Lethbridge Research Centre

Lethbridge Research Centre Management

Led by science, guided by industry need and public good.

The Lethbridge Research Centre is headed by the Centre Management Committee, comprised of management and section heads. The Centre Management Committee determines direction, with advice from Agriculture and Agri-Food Canada leadership and the Centre's own Advisory Committee – a diverse group of third party public and industry representatives.

Centre Management Committee

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Business Development Office

The Centre's in-house Business Development Office manages business partnerships, transfers commercial technology and protects intellectual property rights. The office is designed to leverage the Centre's position as a producer of technology and leading edge agricultural research to benefit industry and the public.

Centre Advisory Committee

The Centre Advisory Committee consists of volunteers from industry, universities, the Provincial Government and the local community, who assist the Centre management in planning the research programs. The Committee meets twice a year to review ongoing programs and overall research direction.

Canada/Alberta Livestock Research Trust Inc.

The Canada/Alberta Livestock Research Trust Inc. (CALRT), in support of the Lethbridge Research Centre, owns all livestock that the Centre uses in its research programs. CALRT through its industry Board of Directors, provides direct financial support and advice for livestock research. In the past year, CALRT has fully funded the construction of feed silos and has made a direct contribution to the Lethbridge Research Centre communications program.

Financial Contributors

Companies/organizations that contributed financially to the Lethbridge Research Centre in 2000/2001

AGX Services • Agricore Cooperative • Agrium Inc. • Alberta Agricultural Research Institute • Alberta Alfalfa Seed Committee • Alberta Conservation Tillage Society • Alberta Corn Committee • Alberta Milk Producers Society • Alberta Pulse Growers Commission • Alberta Seed Potato Inc. • Alberta Soft Wheat Producers Commission • Alberta Sugar Beet Growers • American Home Products Corporation • B.C. Cattleman's Association • B.C. Hydro Power Authority • B.C. Potato & Vegetables Grower Association • Bayer Inc. • Beef Cattle Industry Development Fund • Mr. Bernie Loman • Biotal Canada Ltd. • The Blood Tribe Land Management • C.L. Ranches Ltd. • Can AGRICO Potato Corporation • Canada Alberta Beef Industry Development Fund • Canada/Alberta Livestock Research Trust Inc. • Canada/Saskatchewan Agri-Food Innovation Agreement • Canadian Cattleman's Association – BCRC • Canadian Pacific Railway Company • Canbra Foods Ltd. • Canodev Research Inc. • Cattle Industry Development Council • Chinook Regional Health Authority • Chr. Hansen Biosystems Inc. • Climate Change Action Fund • Continental Lime Ltd. • Dairy Farmers of Canada • Dairy Farmers of Ontario • Department of National Defence Canada • Dow AgroSciences Canada Inc. • Ducks Unlimited Canada • DuPont Canada Inc. • Eli Lilly Canada Inc./Elanco • Frolek Cattle Co. Ltd. • Global Agri Services Inc. • Growsafe Systems Inc. • Gustafson LLC • Highland Valley Copper • The Hostess-Frito-lay Company • IG Micromed Environmental Inc. • Kamloops Stockman's Association • Kane Veterinary Supplies • Keystone Vegetable Producers Association Inc. • Lafarge Canada Inc. • Lamb Weston Inc. • Lockheed Martin Technology Services Group Inc. • Manitoba Chipping Potato Growers Association • Manitoba Horticulture Productivity Enhancement Centre Ltd. • Maple Leaf Potatoes • McCain Produce, Inc. • Midwest Food Products, Inc. • Monsanto Canada Inc. • Mountain View Ranch • Newfield Seeds Company Ltd. • Novus International • Optimum Quality Grains, L.L.C. • Peak of the Market • Performance Genomics Inc. • Potato Growers of Alberta • Prairie Dome Enterprises Ltd. • Prairie Seeds Ltd. • Program for Energy Research and Development • Progressive Seeds Ltd. • Provimi Holding BV • Roche Vitamins Inc. • Rogers Sugar Limited • Saatzucht Vertrieb Lange KG • Sage Creek Grazing Association • Saskatchewan Agriculture Development Fund • Saskatchewan Pulse Crop Development Board • Saskatchewan Seed Potato Growers Association • Smoky Applied Research & Development Association • Sunpine Forest Products Limited • Terralink Horticulture Inc. • The Canadian Charolais Association • The Southern Applied Research Association • United Grain Growers – ProLivestock • United Grain Growers Ltd. – Agripro Seeds • Université de Québec à Trois Rivières • University of Manitoba • University of Saskatchewan • Waldron Grazing Association • J. Webster Laboratories Inc. • Western Beef Development Centre • Western Cooperative Fertilizers Ltd. • Western Grains Research Foundation • Wiseman Feeders Ltd.

Centre Business Activity

The Lethbridge Research Centre approach to research is designed to provide value to its public and private investors.

Operating Budget 2000-2001

Total budget: $34.8 million

A-Base Salary: $15.0 million
Non-pay operating: $4.8 million
Outside funding: $9.7 million
Major capital: $5.3 million

Outside Funding 2000-2001

Total outside funding: $9.7 million

Industry: $3.0 million
AAFC Matching Investment Initiative: $2.8 million
Canada Alberta Beef Industry Development Fund: $1.7 million
Canada/Alberta Livestock Research Trust: $900,000
Alberta Provincial Government: $838,000
Other research funding organizations: $482,100

Projected 2001-2002 Operating Budget

Total projected operating budget: $41.3 million

A Base Salary: $15.2 million
Non-pay operating: $4.7 million
Outside funding: $9.4 million
Major capital (includes new building construction): $12.0 million

Projected 2001-2002 Outside Funding

Total projected outside funding: $9.4 million*

Industry: $3.2 million
AAFC Matching Investment Initiative: $2.9 million
Canada Alberta Beef Industry Development Fund: $1.4 million
Canada/Alberta Livestock Research Trust: $870,600
Alberta Provincial Government: $503,400
Other research funding organizations: $500,000

*Figures may change throughout year. Outside funding will increase as the year progresses.

Research Programs

The Centre is comprised of three research sections: Crop Sciences, Land Resource Sciences and Livestock Sciences. Several core research priorities are established within each section.

The Lethbridge Research Centre is part of a network of Agriculture and Agri-Food Canada research centres across the country, with links to the global research community. Research throughout the network is focused on three main areas: supporting economic growth through innovation, maintaining the security of the food system and protecting the health of the environment.

Currently, Lethbridge Research Centre programs are organized around three main sections: livestock sciences, crop sciences and land resource sciences, each with several core research priorities. Over the coming months, Agriculture and Agri-Food Canada will move to a further integration of programs throughout the research network, to meet a range of new opportunities.

The following is a listing of the main research areas at the Lethbridge Research Centre. More detailed information is available on the Centre's Web site: **www.agr.gc.ca/science/lethbridge**.

Livestock Sciences

Pest management. Flies take their toll on feedlot production by irritating cattle and lowering productivity. Research offers innovative management techniques that deliver relief to cattle, with an emphasis on control alternatives that save money and protect the environment.

Genetics and physiology. Strengthening Canada's cattle seedstock through genetics builds a solid foundation for future success. Finding better ways to manage physiological processes such as reproduction, nutrition and growth are fundamental ways to improve animal efficiency.

Ruminant nutrition. Nutrition studies improve efficiency to benefit both the animal and the farmer's bottom line, while reducing manure phosphorous and other potential wastes.

Feed microbiology and biotechnology. This research explores powerful ways to get more performance and efficiency out of feed, and reduce the need for artificial inputs.

Bioeconomics. Economics studies translate research technology into marketable economic benefits for the farmer and the industry.

Land Resource Sciences

Range management. Western Canada includes vast tracts of rangeland that support a wide range of plant and animal species. This fragile resource faces more demands than ever before and needs to be carefully managed. Research aims to protect rangeland for the ranching industry and society as a whole.

Manure management. The key to manure management is utilizing its nutrients and organic matter as a resource. A main research focus is composting, which has added benefits of pathogen and weed seed elimination.

Water and air quality. Few things are as precious to Canadians as a pristine water supply and clean air. Research provides the knowledge to develop high standards in these areas, and technology to limit the impact of the agriculture industry on the environment.

Soil management. Scientists unlock the secrets of natural processes within soils. Armed with this knowledge, they can improve production systems and promote healthy soils over the long term.

Remote sensing. One of the most powerful tools for agricultural management is remote sensing, including leading technologies such as Geographic Information Systems. This research provides detailed information to monitor and improve a wide array of land use practices.

Economics. Knowing the dollars and cents behind new research technology helps industry make sense of how best to implement and take advantage of science progress.

Crop Sciences

New crop varieties. Crops with superior genetics mean everything from higher quality and yield to built-in pest resistance. The Centre produces new varieties of winter wheat, soft white spring wheat, beans, potatoes and forages.

Disease resistance. Innovative tools to battle disease reduce the need for pesticides, lower production costs and protect both the land and crops.

Cropping systems. With environmental and production efficiency concerns at the forefront of today's agriculture, managing cropping systems has never been more important. Scientists design new tools and strategies to meet these demands.

Weed biocontrol. Biocontrol is poised to become a key strategy for weed control. Biocontrol research offers several unique advantages because it uses naturally-occurring, living organisms as control tools, offering safe, precise and effective control.

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Lethbridge Research Centre Facilities

Established in 1906 as a Dominion Experimental Station, today the Centre employs 400 full, part-time and seasonal staff, including approximately 80 scientists.

Expanding main Centre facilities

The Lethbridge Research Centre is one of Western Canada's oldest public research institutions. Today the Research Centre consists of a 25,000 square meter laboratory and office complex, and 500 ha (1,230 ac.) of adjacent land.

Currently, the Centre has extensive research facilities in crops, soils and ruminant livestock. The beef unit facilities have capacity for 1,635 head. Included is a 285 head barn which allows specialized feeding of individual animals, a dairy and beef metabolism barn, a 1,000 head capacity feedlot with 48 small pens and four large pens, as well as several beef barns.

Dairy facilities include 275 head capacity with a main barn, calf barn, loose housing and dry barn. Sheep facilities include a research barn, pens and isolation building for using sheep in ruminant model studies. A state-of-the art feedmill provides a backdrop to nutrition studies. Animal parasitology facilities include a controlled environment building, feedlot and holding paddocks. Lab animal facilities for mice, rats, rabbits, hamsters, etc. are contained in an isloated 23 room viviarium (approximately 8,000 sq. ft.).

The Centre has specialized biocontrol facilities that include insect rearing rooms, insect quarantine facilities, a microbial culture centre, and extensive greenhouse and laboratory space.

Additionally, a series of long-term cropping rotation studies, both irrigated and dry land, were established as early as 1910. With the new expansion, the Centre will add approximately 7,000 square meters of space for administration and science. This will include state-of-the-art laboratories for biological control research, modern greenhouses, and added office and research space.

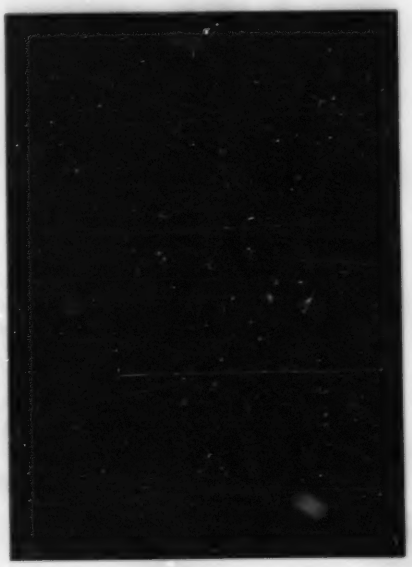
Affiliated research sites

The Kamloops Range Research Unit. British Columbia's major site for range research, the Kamloops Unit was administratively linked with the Centre's range management program in 1993. The Kamloops Unit includes laboratories and 23 ha (57 ac.) of mostly irrigated pasture for growing legumes and grasses. Research is also conducted at the Pass Lake Range site which includes 500 ha (1,230 ac.) of forested rangeland and 40,000 ha (98,400 ac.) of Crown grass and forested grassland.

Onefour Ranch. A 17,000 ha (42,000 ac.) shortgrass prairie range research site near Manyberries, Alta., the Centre's main site for cattle genetics and breeding research, and range management studies. It is home to a 200 cow Angus herd and a 200 cow Charolais herd. Both are owned by the Canada/Alberta Livestock Research Trust Inc. – a unique partnership between the Lethbridge Research Centre and Alberta beef, sheep and dairy producers. Set up as a non-profit, livestock industry driven research trust, all revenues from sale of the livestock and their by-products are reinvested in research programs.

Stavely site. A 390 ha (960 ac.) site for rough fescue range research.

Vauxhall site. A 190 ha (480 ac.) site for potato, soft white wheat and irrigated rotation research.



Lethbridge Research Centre Staff

Research Centre Management

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Peter Burnett, Assistant Director
Glenn Coulter, Assistant Director

Livestock Sciences

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Dario Columbatto, Ruminant Nutrition
Doug Colwell, Livestock Parasitology
Denny Crews, Genetics
Helen Fairweather, Agricultural Systems Modelling
Kevin Floate, Insect Biocontrol
Bob Forster, Rumen Biotechnology
Darryl Gibb, Ruminant Nutrition
Doug Inglis, Chair, Ruminant Enzymology
Mike Ivan, Nutritional Physiology
Sushil Jacob John, Molecular Biology
John Kastelic, Reproductive Physiology
Karen Koenig, Ruminant Nutrition
Eric Kokko, Electron Microscopy/Image Analysis
George Kyei-Poku, Insect Pathology
Tim Lysyk, Livestock Insect Population Ecology
Tim McAllister, Feed Biotechnology/Nutrition
Gerry Mears, Livestock Physiology
Priya Mir, Digestive Physiology
Diego Morgavi, Nutrition/Microbiology
Pius Mwansa, Genetics
Maria Perotti, Livestock Insect Ecology
Ranjana Sharma, Molecular Biology
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Ben Ellert, Carbon Cycling
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Xiying Hao, Soil Physics
Henry Janzen, Soil Biochemistry
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Joanne Little, Water Quality Specialist
Sean McGinn, Agrometeorology
Jim Miller, Soil & Water Specialist
Graham Osler, Soil Ecology
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Anita Shepherd, Crop Modelling
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Elwin Smith, Bioeconomics
Walter Willms, Range Ecology

Kamloops Range Research Unit

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Walter Majak, Range/Plant Biochemistry
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Hector Cárcamo, Insect Pest Management
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Fran Leggett, Electron Microscopy/Image Analysis
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John Lu, DNA Fingerprinting
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